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SEQUENCE LISTING

<110> LIVSHITS, VITALIY
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<120> METHOD FOR PRODUCING L-AMINO ACIDS

<130> 0010-1066-0

<140> 09/459,573
<141> 1999-12-13

<150> RU98124016
<151> 1998-12-30

<150> RU99104431
<151> 1999-03-09

<160> 24

<170> PatentIn version 3.0

<210> 1
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<212> DNA
<213> Artificial Sequence

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<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 1
ggcgagctcc cagtaaccgg aaataag 27

<210> 2

<211> 27

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<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 2
cgctctagaa aggaccacgc attacgg 27

<210> 3

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 3
ggcgagctca gattggttag catattc 27

<210> 4

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 4
cggtctagaa tcagcgaaga atcaggg 27

<210> 5

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 5
ggcgagctca tgttccgtgt cgggtac 27

<210> 6

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 6
ggctctagat agcaagttac taagcgg 27

<210> 7

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 7
ctctgaattc tctcttatta gtttttctga ttgcc 35

<210> 8

<211> 38

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 8
cgtgacctgc agcgttctca cagcgcggta gcctttaa 38

<210> 9

<211> 672

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (1)..(672)

<400> 9

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atg atg cag tta gtt cac tta ttt atg gat gaa atc act atg gat cct       48
Met Met Gln Leu Val His Leu Phe Met Asp Glu Ile Thr Met Asp Pro
1               5                  10                  15

ttg cat gcc gtt tac ctg acc gta gga ctg ttc gtg att act ttt ttt       96
Leu His Ala Val Tyr Leu Thr Val Gly Leu Phe Val Ile Thr Phe Phe
            20                  25                  30

aat ccg gga gcc aat ctc ttt gtg gta gta caa acc agc ctg gct tcc      144
Asn Pro Gly Ala Asn Leu Phe Val Val Val Gln Thr Ser Leu Ala Ser
        35                  40                  45

ggt cga cgc gca ggg gtg ctg acc ggg ctg ggc gtg gcg ctg ggc gat      192
Gly Arg Arg Ala Gly Val Leu Thr Gly Leu Gly Val Ala Leu Gly Asp
    50                  55                  60

gca ttt tat tcc ggg ttg ggt ttg ttt ggt ctt gca acg cta att acg      240
Ala Phe Tyr Ser Gly Leu Gly Leu Phe Gly Leu Ala Thr Leu Ile Thr
65                  70                  75                  80

cag tgt gag gag att ttt tcg ctt atc aga atc gtc ggc ggc gct tat      288
Gln Cys Glu Glu Ile Phe Ser Leu Ile Arg Ile Val Gly Gly Ala Tyr
                85                  90                  95

ctc tta tgg ttt gcg tgg tgc agc atg cgc cgc cag tca aca ccg caa      336
Leu Leu Trp Phe Ala Trp Cys Ser Met Arg Arg Gln Ser Thr Pro Gln
            100                 105                 110

atg agc aca cta caa caa ccg att agc gcc ccc tgg tat gtc ttt ttt      384
Met Ser Thr Leu Gln Gln Pro Ile Ser Ala Pro Trp Tyr Val Phe Phe
        115                 120                 125

cgc cgc gga tta att acc gat ctc tct aac ccg caa acc gtt tta ttt      432
Arg Arg Gly Leu Ile Thr Asp Leu Ser Asn Pro Gln Thr Val Leu Phe
    130                 135                 140

ttt atc agt att ttc tca gta aca tta aat gcc gaa aca cca aca tgg      480
Phe Ile Ser Ile Phe Ser Val Thr Leu Asn Ala Glu Thr Pro Thr Trp
145                 150                 155                 160

gca cgt tta atg gcc tgg gcg ggg att gtg ctc gca tca att atc tgg      528
Ala Arg Leu Met Ala Trp Ala Gly Ile Val Leu Ala Ser Ile Ile Trp
                165                 170                 175

cga gtt ttt ctt agt cag gcg ttt tct ttg ccc gct gtg cgt cgt gct      576
Arg Val Phe Leu Ser Gln Ala Phe Ser Leu Pro Ala Val Arg Arg Ala
            180                 185                 190

tat ggg cgt atg caa cgc gtt gcc agt cgg gtt att ggt gca att att      624
Tyr Gly Arg Met Gln Arg Val Ala Ser Arg Val Ile Gly Ala Ile Ile
        195                 200                 205
```

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ggt gta ttc gcg cta cgc ctg att tac gaa ggg gtg acg cag cgg tga      672
Gly Val Phe Ala Leu Arg Leu Ile Tyr Glu Gly Val Thr Gln Arg
    210                 215                 220
```

<210> 10

<211> 223

<212> PRT

<213> Escherichia coli

<400> 10

```
Met Met Gln Leu Val His Leu Phe Met Asp Glu Ile Thr Met Asp Pro
1               5                  10                  15

Leu His Ala Val Tyr Leu Thr Val Gly Leu Phe Val Ile Thr Phe Phe
            20                  25                  30

Asn Pro Gly Ala Asn Leu Phe Val Val Gln Thr Ser Leu Ala Ser
        35                  40                  45

Gly Arg Arg Ala Gly Val Leu Thr Gly Leu Gly Val Ala Leu Gly Asp
    50                  55                  60

Ala Phe Tyr Ser Gly Leu Gly Leu Phe Gly Leu Ala Thr Leu Ile Thr
65                  70                  75                  80

Gln Cys Glu Glu Ile Phe Ser Leu Ile Arg Ile Val Gly Gly Ala Tyr
                85                  90                  95

Leu Leu Trp Phe Ala Trp Cys Ser Met Arg Arg Gln Ser Thr Pro Gln
            100                 105                 110

Met Ser Thr Leu Gln Gln Pro Ile Ser Ala Pro Trp Tyr Val Phe Phe
        115                 120                 125

Arg Arg Gly Leu Ile Thr Asp Leu Ser Asn Pro Gln Thr Val Leu Phe
    130                 135                 140

Phe Ile Ser Ile Phe Ser Val Thr Leu Asn Ala Glu Thr Pro Thr Trp
145                 150                 155                 160

Ala Arg Leu Met Ala Trp Ala Gly Ile Val Leu Ala Ser Ile Ile Trp
                165                 170                 175
```

```
Arg Val Phe Leu Ser Gln Ala Phe Ser Leu Pro Ala Val Arg Arg Ala
            180                 185                 190

Tyr Gly Arg Met Gln Arg Val Ala Ser Arg Val Ile Gly Ala Ile Ile
        195                 200                 205

Gly Val Phe Ala Leu Arg Leu Ile Tyr Glu Gly Val Thr Gln Arg
    210                 215                 220
```

<210> 11

<211> 639

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (1)..(639)

<400> 11

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gtg ttc gct gaa tac ggg gtt ctg aat tac tgg acc tat ctg gtt ggg       48
Val Phe Ala Glu Tyr Gly Val Leu Asn Tyr Trp Thr Tyr Leu Val Gly
1               5                   10                  15

gcc att ttt att gtg ttg gtg cca ggg cca aat acc ctg ttt gta ctc       96
Ala Ile Phe Ile Val Leu Val Pro Gly Pro Asn Thr Leu Phe Val Leu
            20                  25                  30

aaa aat agc gtc agt agc ggt atg aaa ggc ggt tat ctt gcg gcc tgc      144
Lys Asn Ser Val Ser Ser Gly Met Lys Gly Gly Tyr Leu Ala Ala Cys
        35                  40                  45

ggt gta ttt att ggc gat gcg gta ttg atg ttt ctg gca tgg gct gga      192
Gly Val Phe Ile Gly Asp Ala Val Leu Met Phe Leu Ala Trp Ala Gly
    50                  55                  60

gtg gcg aca tta att aag acc acc ccg ata tta ttc aac att gta cgt      240
Val Ala Thr Leu Ile Lys Thr Thr Pro Ile Leu Phe Asn Ile Val Arg
65                  70                  75                  80

tat ctt ggt gcg ttt tat ttg ctc tat ctg ggg agt aaa att ctt tac      288
Tyr Leu Gly Ala Phe Tyr Leu Leu Tyr Leu Gly Ser Lys Ile Leu Tyr
                85                  90                  95

gcg acc ctg aag ggt aaa aat agc gag gcc aaa tcc gat gag ccc caa      336
Ala Thr Leu Lys Gly Lys Asn Ser Glu Ala Lys Ser Asp Glu Pro Gln
            100                 105                 110
```

```
tac ggt gct att ttt aaa cgc gcg tta att ttg agc ctg act aat ccg      384
Tyr Gly Ala Ile Phe Lys Arg Ala Leu Ile Leu Ser Leu Thr Asn Pro
        115                 120                 125

aaa gcc att ttg ttc tat gtg tcg ttt ttc gta cag ttt atc gat gtt      432
Lys Ala Ile Leu Phe Tyr Val Ser Phe Phe Val Gln Phe Ile Asp Val
    130                 135                 140

aat gcc cca cat acg gga att tca ttc ttt att ctg gcg gcg acg ctg      480
Asn Ala Pro His Thr Gly Ile Ser Phe Phe Ile Leu Ala Ala Thr Leu
145                 150                 155                 160

gaa ctg gtg agt ttc tgc tat ttg agc ttc ctg att ata tct ggt gct      528
Glu Leu Val Ser Phe Cys Tyr Leu Ser Phe Leu Ile Ile Ser Gly Ala
                165                 170                 175

ttt gtc acg cag tac ata cgt acc aaa aag aaa ctg gct aaa gtt ggc      576
Phe Val Thr Gln Tyr Ile Arg Thr Lys Lys Lys Leu Ala Lys Val Gly
            180                 185                 190

aac tca ctg att ggt ttg atg ttc gtg ggt ttc gct gcc cga ctg gcg      624
Asn Ser Leu Ile Gly Leu Met Phe Val Gly Phe Ala Ala Arg Leu Ala
        195                 200                 205

acg ctg caa tcc tga                                                 639
Thr Leu Gln Ser
    210
```

<210> 12

<211> 212

<212> PRT

<213> Escherichia coli

<400> 12

```
Val Phe Ala Glu Tyr Gly Val Leu Asn Tyr Trp Thr Tyr Leu Val Gly
1               5                   10                  15

Ala Ile Phe Ile Val Leu Val Pro Gly Pro Asn Thr Leu Phe Val Leu
            20                  25                  30

Lys Asn Ser Val Ser Ser Gly Met Lys Gly Gly Tyr Leu Ala Ala Cys
        35                  40                  45

Gly Val Phe Ile Gly Asp Ala Val Leu Met Phe Leu Ala Trp Ala Gly
    50                  55                  60

Val Ala Thr Leu Ile Lys Thr Thr Pro Ile Leu Phe Asn Ile Val Arg
65                  70                  75                  80
```

```
Tyr Leu Gly Ala Phe Tyr Leu Leu Tyr Leu Gly Ser Lys Ile Leu Tyr
                85                  90                  95

Ala Thr Leu Lys Gly Lys Asn Ser Glu Ala Lys Ser Asp Glu Pro Gln
            100                 105                 110

Tyr Gly Ala Ile Phe Lys Arg Ala Leu Ile Leu Ser Leu Thr Asn Pro
        115                 120                 125

Lys Ala Ile Leu Phe Tyr Val Ser Phe Phe Val Gln Phe Ile Asp Val
    130                 135                 140

Asn Ala Pro His Thr Gly Ile Ser Phe Phe Ile Leu Ala Ala Thr Leu
145                 150                 155                 160

Glu Leu Val Ser Phe Cys Tyr Leu Ser Phe Leu Ile Ile Ser Gly Ala
                165                 170                 175

Phe Val Thr Gln Tyr Ile Arg Thr Lys Lys Lys Leu Ala Lys Val Gly
            180                 185                 190

Asn Ser Leu Ile Gly Leu Met Phe Val Gly Phe Ala Ala Arg Leu Ala
        195                 200                 205

Thr Leu Gln Ser
    210
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<210> 13

<211> 588

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (1)..(588)

<400> 13

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gtg aca ccg acc ctt tta agt gct ttt tgg act tac acc ctg att acc       48
Val Thr Pro Thr Leu Leu Ser Ala Phe Trp Thr Tyr Thr Leu Ile Thr
1               5                   10                  15
```

```
gct atg acg cca gga ccg aac aat att ctc gcc ctt agc tct gct acg        96
Ala Met Thr Pro Gly Pro Asn Asn Ile Leu Ala Leu Ser Ser Ala Thr
            20                  25                  30

tcg cat gga ttt cgt caa agt acc cgc gtg ctg gca ggg atg agt ctg       144
Ser His Gly Phe Arg Gln Ser Thr Arg Val Leu Ala Gly Met Ser Leu
        35                  40                  45

gga ttt ttg att gtg atg tta ctg tgt gcg ggc att tca ttt tca ctg       192
Gly Phe Leu Ile Val Met Leu Leu Cys Ala Gly Ile Ser Phe Ser Leu
    50                  55                  60

gca gtg att gac ccg gca gcg gta cac ctt ttg agt tgg gcg ggg gcg       240
Ala Val Ile Asp Pro Ala Ala Val His Leu Leu Ser Trp Ala Gly Ala
65                  70                  75                  80

gca tat att gtc tgg ctg gcg tgg aaa atc gcc acc agc cca aca aag       288
Ala Tyr Ile Val Trp Leu Ala Trp Lys Ile Ala Thr Ser Pro Thr Lys
                85                  90                  95

gaa gac gga ctt cag gca aaa cca atc agc ttt tgg gcc agc ttt gct       336
Glu Asp Gly Leu Gln Ala Lys Pro Ile Ser Phe Trp Ala Ser Phe Ala
            100                 105                 110

ttg cag ttt gtg aac gtc aaa atc att ttg tac ggt gtt acg gca ctg       384
Leu Gln Phe Val Asn Val Lys Ile Ile Leu Tyr Gly Val Thr Ala Leu
        115                 120                 125

tcg acg ttt gtt ctg ccg caa aca cag gcg tta agc tgg gta gtt ggc       432
Ser Thr Phe Val Leu Pro Gln Thr Gln Ala Leu Ser Trp Val Val Gly
    130                 135                 140

gtc agc gtt ttg ctg gcg atg att ggg acg ttt ggc aat gtg tgc tgg       480
Val Ser Val Leu Leu Ala Met Ile Gly Thr Phe Gly Asn Val Cys Trp
145                 150                 155                 160

gcg ctg gcg ggg cat ctg ttt cag cga ttg ttt cgc cag tat ggt cgc       528
Ala Leu Ala Gly His Leu Phe Gln Arg Leu Phe Arg Gln Tyr Gly Arg
                165                 170                 175

cag tta aat atc gtg ctt gcc ctg ttg ctg gtc tat tgc gcg gta cgc       576
Gln Leu Asn Ile Val Leu Ala Leu Leu Leu Val Tyr Cys Ala Val Arg
            180                 185                 190

att ttc tat taa                                                      588
Ile Phe Tyr
        195
```

<210> 14

<211> 195

<212> PRT

<213> Escherichia coli

<400> 14

```
Val Thr Pro Thr Leu Leu Ser Ala Phe Trp Thr Tyr Thr Leu Ile Thr
1               5                  10                  15

Ala Met Thr Pro Gly Pro Asn Asn Ile Leu Ala Leu Ser Ser Ala Thr
            20                  25                  30

Ser His Gly Phe Arg Gln Ser Thr Arg Val Leu Ala Gly Met Ser Leu
        35                  40                  45

Gly Phe Leu Ile Val Met Leu Leu Cys Ala Gly Ile Ser Phe Ser Leu
    50                  55                  60

Ala Val Ile Asp Pro Ala Ala Val His Leu Leu Ser Trp Ala Gly Ala
65                  70                  75                  80

Ala Tyr Ile Val Trp Leu Ala Trp Lys Ile Ala Thr Ser Pro Thr Lys
                85                  90                  95

Glu Asp Gly Leu Gln Ala Lys Pro Ile Ser Phe Trp Ala Ser Phe Ala
            100                 105                 110

Leu Gln Phe Val Asn Val Lys Ile Ile Leu Tyr Gly Val Thr Ala Leu
        115                 120                 125

Ser Thr Phe Val Leu Pro Gln Thr Gln Ala Leu Ser Trp Val Val Gly
    130                 135                 140

Val Ser Val Leu Leu Ala Met Ile Gly Thr Phe Gly Asn Val Cys Trp
145                 150                 155                 160

Ala Leu Ala Gly His Leu Phe Gln Arg Leu Phe Arg Gln Tyr Gly Arg
                165                 170                 175

Gln Leu Asn Ile Val Leu Ala Leu Leu Leu Val Tyr Cys Ala Val Arg
            180                 185                 190

Ile Phe Tyr
        195
```

<210> 15

<211> 636

<212> DNA

<213> Escherichia coli

<220>

<221> CDS

<222> (1)..(636)

<400> 15

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gtg ttt tct tat tac ttt caa ggt ctt gca ctt ggg gcg gct atg atc       48
Val Phe Ser Tyr Tyr Phe Gln Gly Leu Ala Leu Gly Ala Ala Met Ile
1               5                  10                  15

cta ccg ctc ggt cca caa aat gct ttt gtg atg aat cag ggc ata cgt       96
Leu Pro Leu Gly Pro Gln Asn Ala Phe Val Met Asn Gln Gly Ile Arg
            20                  25                  30

cgt cag tac cac att atg att gcc tta ctt tgt gct atc agc gat ttg      144
Arg Gln Tyr His Ile Met Ile Ala Leu Leu Cys Ala Ile Ser Asp Leu
        35                  40                  45

gtc ctg att tgc gcc ggg att ttt ggt ggc agc gcg tta ttg atg cag      192
Val Leu Ile Cys Ala Gly Ile Phe Gly Gly Ser Ala Leu Leu Met Gln
    50                  55                  60

tcg ccg tgg ttg ctg gcg ctg gtc acc tgg ggc ggc gta gcc ttc ttg      240
Ser Pro Trp Leu Leu Ala Leu Val Thr Trp Gly Gly Val Ala Phe Leu
65                  70                  75                  80

ctg tgg tat ggt ttt ggc gct ttt aaa aca gca atg agc agt aat att      288
Leu Trp Tyr Gly Phe Gly Ala Phe Lys Thr Ala Met Ser Ser Asn Ile
                85                  90                  95

gag tta gcc agc gcc gaa gtc atg aag caa ggc aga tgg aaa att atc      336
Glu Leu Ala Ser Ala Glu Val Met Lys Gln Gly Arg Trp Lys Ile Ile
            100                 105                 110

gcc acc atg ttg gca gtg acc tgg ctg aat ccg cat gtt tac ctg gat      384
Ala Thr Met Leu Ala Val Thr Trp Leu Asn Pro His Val Tyr Leu Asp
        115                 120                 125

act ttt gtt gta ctg ggc agc ctt ggc ggg caa ctt gat gtg gaa cca      432
Thr Phe Val Val Leu Gly Ser Leu Gly Gly Gln Leu Asp Val Glu Pro
    130                 135                 140

aaa cgc tgg ttt gca ctc ggg aca att agc gcc tct ttc ctg tgg ttc      480
Lys Arg Trp Phe Ala Leu Gly Thr Ile Ser Ala Ser Phe Leu Trp Phe
145                 150                 155                 160

ttt ggt ctg gct ctt ctc gca gcc tgg ctg gca ccg cgt ctg cgc acg      528
Phe Gly Leu Ala Leu Leu Ala Ala Trp Leu Ala Pro Arg Leu Arg Thr
                165                 170                 175

gca aaa gca cag cgc att atc aat ctg gtt gtg gga tgt gtt atg tgg      576
Ala Lys Ala Gln Arg Ile Ile Asn Leu Val Val Gly Cys Val Met Trp
```

```
            180                 185                 190

ttt att gcc ttg cag ctg gcg aga gac ggt att gct cat gca caa gcc      624
Phe Ile Ala Leu Gln Leu Ala Arg Asp Gly Ile Ala His Ala Gln Ala
        195                 200                 205

ttg ttc agt tag                                                     636
Leu Phe Ser
    210
```

<210> 16

<211> 211

<212> PRT

<213> Escherichia coli

<400> 16

```
Val Phe Ser Tyr Tyr Phe Gln Gly Leu Ala Leu Gly Ala Ala Met Ile
1               5                   10                  15

Leu Pro Leu Gly Pro Gln Asn Ala Phe Val Met Asn Gln Gly Ile Arg
            20                  25                  30

Arg Gln Tyr His Ile Met Ile Ala Leu Leu Cys Ala Ile Ser Asp Leu
        35                  40                  45

Val Leu Ile Cys Ala Gly Ile Phe Gly Gly Ser Ala Leu Leu Met Gln
    50                  55                  60

Ser Pro Trp Leu Leu Ala Leu Val Thr Trp Gly Gly Val Ala Phe Leu
65                  70                  75                  80

Leu Trp Tyr Gly Phe Gly Ala Phe Lys Thr Ala Met Ser Ser Asn Ile
                85                  90                  95

Glu Leu Ala Ser Ala Glu Val Met Lys Gln Gly Arg Trp Lys Ile Ile
            100                 105                 110

Ala Thr Met Leu Ala Val Thr Trp Leu Asn Pro His Val Tyr Leu Asp
        115                 120                 125

Thr Phe Val Val Leu Gly Ser Leu Gly Gly Gln Leu Asp Val Glu Pro
    130                 135                 140
```

Lys Arg Trp Phe Ala Leu Gly Thr Ile Ser Ala Ser Phe Leu Trp Phe
145 150 155 160

Phe Gly Leu Ala Leu Leu Ala Ala Trp Leu Ala Pro Arg Leu Arg Thr
165 170 175

Ala Lys Ala Gln Arg Ile Ile Asn Leu Val Val Gly Cys Val Met Trp
180 185 190

Phe Ile Ala Leu Gln Leu Ala Arg Asp Gly Ile Ala His Ala Gln Ala
195 200 205

Leu Phe Ser
210

<210> 17

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 17
gtgtggaacc gacgccggat 20

<210> 18

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 18
tgttgtatgg tacggggttc gag 23

<210> 19

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 19
ctttgccaat cccgtctccc 20

<210> 20

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 20
gccccatgca taacggaaag 20

<210> 21

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 21
gaagatcttg taggccggat aaggcg 26

<210> 22

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 22
tggttttacc aattggccgc 20

<210> 23

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 23
acttctcccg cgagccagtt c 21

<210> 24

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: synthetic DNA

<400> 24
ggcaagctta gcgcctctgt t 21